

## REMARKS

Claims 1, 3-4, 8, 10-12, 14-15, and 17-24 are in the case. The above amendments place the case in better condition for allowance or appeal. Favorable action thereon is requested in light of the following comments. Should the amendment be entered, no fees are believed to be due for the new claims because the number of claims cancelled is greater than the number of claims added.

Claims 1, 8, and 15 have been amended to recite an amount of about 0.2 wt% inorganic thiocyanate in the aqueous brine solution. Support for this amendment is found in the Specification on Page 4 in paragraph 0018 and in the Examples (Page 5). Claims 1 and 8 have been amended to recite that the concentrated brine solution is devoid of a thiocyanate-decomposing amount of methanol. Support for this amendment is in original Claim 15, part f). Claim 1 has been amended to include the limitations of cancelled Claims 3 and 4. Claim 8 has been amended to include the limitations of cancelled Claims 10 and 11. In Claim 15, part d) has been amended to replace the word "isocyanate" with the word "thiocyanate." This corrects a clerical error; support for this change is found on Page 4, paragraph 0018 of the Specification. Support for new Claims 23 and 24 is found near the bottom of Page 2 in paragraph 0007 of the Specification. Multiple-dependent Claims 19-22 have been amended to reflect the cancellation of some of the claims from which they depended; these amendments do not change the scope of Claims 19-22 in any way in regard to remaining claims from which they still depend.

The indication of allowability for Claims 13 and 14 is noted with sincere appreciation. The nonobviousness of Claims 1-22 is also noted with sincere appreciation.

### Objection to Claims 13 and 14

The objection to Claims 13 and 14 has been rendered moot by the amendment to Claim 12. Claim 12 now incorporates the limitations of Claim 13, which has been cancelled. Thus Claim 12 is now deemed to be allowable. Claim 14 has been amended to reflect a change in dependency from cancelled Claim 13 to independent Claim 12. For the record, it is stated that this amendment to Claim 14 does not change the scope of Claim 14. Claim 21, which depends from Claim 12 or 14, should also be deemed allowable because the claims from which it depends are now in allowable form.

### Rejections under §102(b)

As mentioned above, Claim 12 now incorporates the limitations of Claim 13, which is

not rejected herein. Thus the §102(b) rejections discussed below are submitted to be rendered moot to Claim 12 as amended.

The references cited in this Office Action give lots of choices and broad ranges. While the subject matter of the present claims may seem to be embraced by the broad ranges taught by these references, no specific examples falling within the claimed range are disclosed. Further, evidence of unexpected results in the claimed range is presented as Exhibit A (see below). Recent experimental work has shown that an amount of inorganic thiocyanate of about 0.2 wt% inorganic thiocyanate based on the total weight of the solution is particularly beneficial. In particular, while increasing the thiocyanate concentration in the aqueous brine solution up to about 0.2 wt%, the corrosion rate of the aqueous brine solution decreases, but surprisingly, at thiocyanate concentrations of 0.3 wt%, the corrosion rate has begun to increase (see Exhibit A below). Thus, an inorganic thiocyanate amount of about 0.2 wt% in the aqueous brine solution has an unexpected benefit.

Rejection under §102(b) citing Burke et al.

Claims 1-2, 5-6, 8-9, 12, 15-16, and 19-22 stand rejected under § 102(b) as anticipated by Burke et al. (*Corrosion*, 1988, March 21-25, pages 212/1-212/10). This rejection is respectfully traversed. The claims as amended distinguish over Burke et al. As the Examiner states, Burke et al. teaches the use of thiocyanate in brines containing NaBr with or without NaCl. The present claims are not directed brines containing NaBr. Thus, present Claims 1, 8, 12, 15, and 19-22 are novel over Burke et al., and it is respectfully requested that this rejection be withdrawn.

Rejection under §102(b) citing GB 2027686

Claims 1, 3-8, 10-12, 15, and 17-22 stand rejected under § 102(b) as anticipated by GB 2027686. This rejection is respectfully traversed. GB 2027686 discloses a thiocyanate concentration range which is broad (0.3 grams per liter to 20 grams per liter; equivalent to 0.03 wt% to 2 wt%; page 2, lines 21-27). GB 2027686 does not specifically disclose any composition falling within the scope of the present claims. Thus, present Claims 1, 3-4, 8, 10-12, 15, and 17-22 are novel over GB 2027686, and withdrawal of this rejection is respectfully requested.

Rejection under §102(b) citing WO 88/01010

Claims 1, 5, 7-8, 12, and 19-20 stand rejected under § 102(b) as anticipated by WO 88/01010. This rejection is respectfully traversed. Corrosion inhibitors are disclosed on page 7 of WO 88/01010. However, no concentrations for the corrosion inhibitors are mentioned

anywhere in WO 88/01010. Therefore, present Claims 1, 8, and 19-20 are novel over WO 88/01010, since WO 88/01010 does not teach the use of corrosion inhibitors in any particular amount, including an amount within the scope of the present claims. The rejection over WO 88/01010 fails to establish a *prima facie* case of anticipation over present Claims 1, 8, 12, and 19-20, and thus withdrawal of the rejection is respectfully requested.

Rejection under §102(b) citing Hensen

Claims 1, 4-8, 11-12, 15, and 18-22 stand rejected under § 102(b) as anticipated by Hensen (U.S. 4,980,074). This rejection is respectfully traversed. While Hensen discloses a broad range for the thiocyanate concentration (250 ppm to 10,000 ppm; equivalent to 0.025 wt% to 1 wt%; column 2, lines 31-32), Hensen does not specifically disclose any composition falling within the scope of the present claims. Thus, present Claims 1, 4, 8, 11-12, 15, and 18-22 are novel over Hensen, and this rejection should be withdrawn.

The above remarks regarding the novelty of the examined claims over the cited references apply equally to new Claims 23 and 24.

In light of the above amendments and foregoing remarks, the case is believed to be in condition for allowance. Prompt notification to this effect would be sincerely appreciated.

If any matters remain that require further consideration, the Examiner is requested to telephone the undersigned at the number given below so that such matters may be discussed, and if possible, promptly resolved.

Please continue to address all correspondence in this Application to Mr. Edgar E. Spielman, Jr. at the address of record.

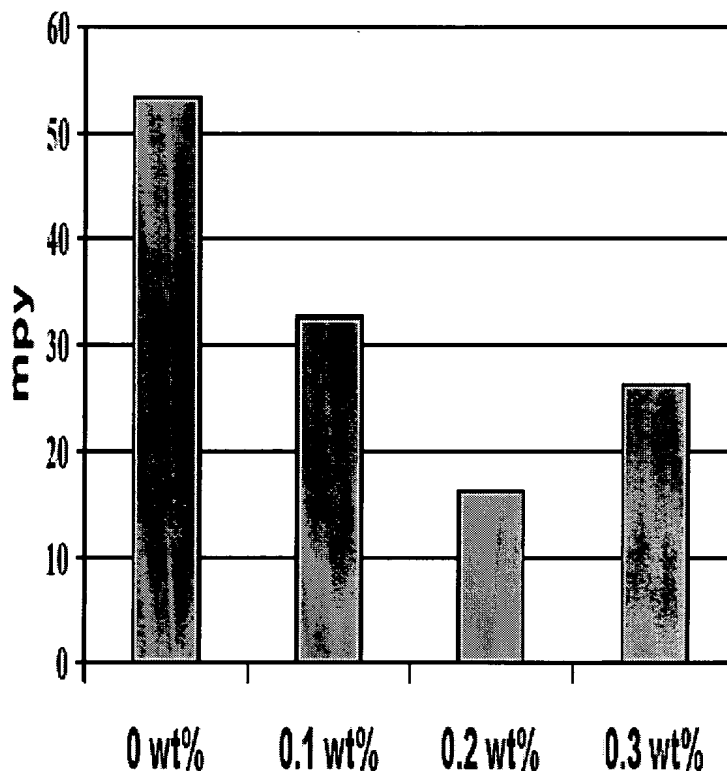
Respectfully submitted,



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**Exhibit A**

In the graph below, the x axis is the concentration of sodium thiocyanate in the aqueous brine solution, and the y axis is the corrosion rate in mpy.



The experiments to generate the data in the above graph were conducted as follows:

An aqueous brine solution of  $\text{ZnBr}_2$  and  $\text{CaBr}_2$  having a density of 19.2 lb/gal (sold as WELLBROM<sup>®</sup> 19.2 by Albemarle Corporation, 51-55 wt%  $\text{ZnBr}_2$  and 19-22 wt%  $\text{CaBr}_2$ ) was combined with sodium thiocyanate and sheared for a few minutes with a Hamilton Beach mixer. Each metal coupon (C1018 Carbon Steel, Metal Samples, 3 inches x  $\frac{1}{2}$  inch x  $\frac{1}{8}$  inch) was rinsed with acetone, dried with a nitrogen stream and weighed to the nearest 0.1 mg. The weight of the each coupon and its coupon number were recorded. Three coupons were mounted together on a threaded Teflon rod; the coupons were again rinsed with acetone

and dried with nitrogen. Some of the aqueous brine solution (180 mL) was measured into a glass cylinder (volume/area = 20 mL/in<sup>2</sup>). The coupon assembly was placed upright in the glass cylinder, submersing the coupon assembly into the aqueous brine solution. A glass insert was placed inside the aging cell, and the glass insert was covered with a Teflon cap. The aging cell was closed and the screws were tightened to seal the assembly. Nitrogen pressure (500 psi) was applied to test for leakage. The cell was placed in an oven for 7 days at 175°C. After the test period, the cell was cooled in a water bath for at least one hour. The pressure was vented and the cell was opened. The coupon panel was disassembled.

An HCl cleaning solution (aq., 15%) was prepared by adding 125 g of concentrated HCl to 175 mL of tap water. Each coupon was cleaned by dipping into a beaker containing the 15 % HCl solution for approximately 30 seconds, then rinsed with water, and scrubbed with a pad to loosen the solid deposit. The coupon was then rinsed with acetone, dried under nitrogen and re-weighed. The weight of each coupon was recorded, and the corrosion rate was calculated.

The equation for calculating the corrosion rate is well known, and is as follows:

$$\text{Corrosion Rate (mpy)} = \frac{(W \times 534 \times 1000)}{(D \times A \times T)}$$

where

W = weight loss (g)

D = coupon density (g/mL)

A = total coupon surface area (square inches)

T = time (hours).